New York, New Haven & Hartford Railroad,
Fort Point Channel Rolling Lift Bridge
(Scherzer Rolling Lift Bridge)
Spanning Fort Point Channel
Boston
Suffolk County
Massachusetts

HAER MA-35

HAER
MASS,
13-BOST,
82-

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

PHOTOGRAPHS

Historic American Engineering Record
National Park Service
Department of the Interior
Washington, D.C. 20240

ADDENDUM
FOLLOWS

HAER
MASS,
13-BOST,
82-

HISTORIC AMERICAN ENGINEERING RECORD

MA-35

NEW YORK, NEW HAVEN & HARTFORD RAILROAD,
FORT POINT CHANNEL ROLLING LIFT BRIDGE
(SCHERZER ROLLING LIFT BRIDGE)

Date: Circa 1898

Location: Spanning Fort Point Channel, Boston, Suffolk County Massachusetts.

Engineer: William Scherzer, designer.

Owner: Originally; New York, New Haven & Hartford Railroad.
Presently: AMTRAK

Significance: The construction of South Station in 1896-98, involved the rerouting of several of the old lines from the west and south. The New York, New Haven & Hartford Railroad constructed a six-track rolling-lift bridge, the first of a new class of bascule lift bridges invented by William Scherzer (1858-93). The bridge was the fourth to be built by the Scherzer Rolling Lift Bridge Company, and the first to be constructed outside of Chicago . The six track bridge is made up of three seperate through riveted truss spans. Each draw span, weighing approximately 500 tons, could be raised or lowered independently of the other two, requiring usually thirty seconds to either open or close. While the bridge remains in use today by AMTRAK and MBTA comuter trains, the operating mechanism has been removed.

Transmitted by: Dan Clement, 1984. Historical information written by Peter Stott.

ADDENDUM TO
NEW YORK, NEW HAVEN & HARTFORD RAILROAD
FORT POINT CHANNEL ROLLING LIFT BRIDGE
(Scherzer Rolling Lift Bridge)
Spanning Fort Point Channel
Boston
Suffolk County
Massachusetts

HAER No. MA-35

HAER
MASS
13-BOST,
82-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
Northeast Field Area
Chesapeake/Allegheny System Support Office
National Park Service
U.S. Custom House
200 Chestnut Street
Philadelphia, PA 19106

FOLLOWS

HISTORIC AMERICAN ENGINEERING RECORD

NEW YORK, NEW HAVEN & HARTFORD RAILROAD
FORT POINT CHANNEL ROLLING LIFT BRIDGE

This report is an addendum to a 1 page report previously transmitted to the Library of Congress in 1982.

Location:	Spanning Fort Point Channel, Boston, Suffolk County, Massachusetts Dorchester Line Railroad, Track Milepost 0.44 Valuation Plan #3.17-41.5 UTM: 19/330430/4690000 Quad: Boston South, MA
Date of Construction:	1898-1900
Engineer and Builder:	Scherzer Rolling Lift Bridge Company, Chicago, IL
Owner:	Massachusetts Bay Transportation Authority
Present Use:	Railroad bridge (inoperable)
Significance:	The New York, New Haven and Hartford Railroad Bridge, today believed to be the oldest surviving Scherzer Rolling Lift Bridge, was the fourth and largest example of this type of moveable bridge yet built and the first example built outside of Chicago. It is a major national example of a moveable bridge technology widely adopted in subsequent years for both railway and highway spans.
Project Information:	This mitigative document was undertaken in 1992-1993 in accordance with a Memorandum of Agreement between the National Park Service, the Massachusetts Highway Department and the Massachusetts Historical Commission for the Central Artery/Third Harbor Tunnel Project. Jane Carolan, Architectural Historian and Project Manager; Peter H. Stott, Bridge Historian; Martin Stupich, Photographer and Connie Brown, Production.

INTRODUCTION

The New York, New Haven and Hartford Scherzer Rolling Lift Bridge was constructed in 1898-1900, as part of the consolidation of four railroads entering Boston from the west and the south. This consolidation, by the New York, New Haven and Hartford Railroads, resulted in the construction of South Station and its associated trainshed and railyard.

This Scherzer Rolling Lift bridge is believed to be the oldest surviving rolling lift bridge in the country. It was the first Scherzer built outside of Chicago and represents an early example of a moveable lift bridge that became widely used in railroads and highways.

The bridge is one of the few remaining elements of the South Station construction project and is one of five bridges that today span Fort Point Channel.

HISTORIC OVERVIEW

Fort Point Channel

Fort Point Channel is a channelized waterway separating downtown Boston from South Boston. Today, the water passage terminates in a culvert emerging from beneath the West Fourth Street Bridge. In the eighteenth century, this was a wide inlet leading to Roxbury Harbor, a large shallow body of water and mud flats fed by tides and creeks. On the west was the neck of the Shawmut Peninsula, and on the east were the farms of Dorchester Neck (now South Boston). In the nineteenth century, as South Boston and Roxbury developed, the Harbor underwent a series of use and name changes in response to a growing city. As South Cove, it became an urban fringe area, not only for Boston, but for the city of Roxbury and town of Dorchester (both of which were annexed to Boston after the Civil War). In the years immediately preceding and following the Civil War, coal yards and heavy industry took advantage of both rail and water connections to make the district a major industrial area.

As commercial development spread along the Boston and South Boston shores, the channel leading to South Bay was narrowed. In the first half of the nineteenth century, the name "Fort Point Channel" was given to the water passage, after the promontory near Rowe's Wharf, east of Fort Hill.[1]

Prior to the 1860s, there were frequent demands to fill in both South Cove and Fort Point Channel. But in the years following the Civil War, as the demand for coal, as well as other bulk materials like building supplies grew, commerce in the cove and channel greatly increased. In 1887, as part of a program in harbor improvements, the Federal Government deepened the channel as far as the Congress Street Bridge.

Fort Point Channel is crossed by numerous bridges. At one time, nine bridges crossed the 1-1/4-mile channel. The earliest bridges were constructed to link the new residential district with the metropolis. The first bridge was erected in 1805. A toll bridge, the new "South Boston Bridge" was built on the present alignment of West Fourth Street. The second bridge, called the Free Bridge to distinguish it from the toll bridge, was erected in 1828, extending Sea Street in Boston to newly made land in South Boston. At its south end, it met the Dorchester Turnpike (later Dorchester Avenue). When South Station was constructed in the late 1890s, the bridge was given a new alignment, extending Dorchester Avenue across the channel, then swinging around to parallel the edge of the channel as far as Summer Street. The pilings and substructure of the later Dorchester Avenue Bridge can be seen alongside the modern 1948 Dorchester Avenue replacement.

During the second quarter of the nineteenth century the channel was physically defined by the wharf developments along its edges. In the days immediately prior to the railroad, much of the largest quantity of commerce was carried by sea, and the Boston waterfront teemed with shipping traffic. Vessels lay along the wharves often four and five deep, and wharf space was at a premium. Developers who could satisfy this demand could reap large profits, and in the 1830s, new real estate developments were organized around unused wharfage rights away from Boston's traditional commercial areas.

The Boston Wharf Company was largely responsible for developing the area on the South Boston side of Fort Point Channel. The company was chartered in 1836 by a group of shipowners with commercial interests in Central America and the Caribbean. In the late 1830s, the company constructed its first wharves along the channel between Dorchester Avenue and Granite Street.

The South Cove Associates, allied with Boston & Worcester Railroad interests, had purchased much of the undeveloped tidal areas south of Harrison Avenue and filled in mudflats on the north side of the channel. Between 1833 and 1839, the company created 55 acres of land, including much of what is today Chinatown and the South Station area.[2] The Boston & Worcester Railroad (later known as the Boston & Albany Railroad), one of the three original railroads to enter Boston in the summer of 1835, built its own terminal at the intersection of Beach Street and Kneeland Avenue. Both the South Cove Associates and the railroad had hoped that the adjacent Merchandise Wharf on the channel would provide the railroad with ocean traffic. But the width of the channel and the drawspan of the Free Bridge (built eight years before) made the location unsuitable, and by 1860 the railroad had secured its own circuitous route across the Charles and Mystic rivers to a new deepwater terminal on the East Boston waterfront. Instead, the Boston & Worcester wharves were taken over by the Old Colony Railroad, as part of its route into Boston.

The Old Colony Railroad

Chartered in March 1844, the original Old Colony Railroad was designed to link Plymouth, Massachusetts and the new railroad center that Boston was fast becoming. By 1846, when the 38-mile Old Colony was completed, seven railroads radiated from Boston. The Old Colony was the first to approach from the south. Although it was largely an inland route from Plymouth as far as Quincy and north through Dorchester, it skirted the edge of Dorchester Bay before crossing South Boston and Fort Point Channel into the area recently laid out by the South Cove Associates. For the first year of its existence it shared quarters with the Boston & Worcester, until in May 1847 it moved to its own building about a block away.

The Old Colony's first bridge over Fort Point Channel was probably the same as those used on the lines going north out of Boston, the "jackknife draw," invented by the Ipswich builder Joseph Ross (1822-1903) for the Eastern Railroad, as early as 1845. The design used cables radiating from a tower to lift the opposite end of a deck span from its seat and swing it horizontally into a position flush against the shore, allowing vessels to pass. A unique refinement of the draw was the manner in which the two parallel rails collapsed against each other by means of pinned crossties. Once the most common type of railroad drawbridge in eastern Massachusetts, the last example, over the Mystic River, was taken out of service about 1989.

This jackknife design was used for the Old Colony's second bridge over the channel. A rare construction photograph from 1899 ~~(photocopy MA-35-49)~~ depicts the three-track jackknife draw that was still in use while the present rolling lift was being constructed. The wooden structure provided a single, 36-foot wide opening for vessels to pass through,[3] and the annual reports of the Board of Harbor and Land Commissioners occasionally note petitions by the railroad to widen or extent their bridge although this never occurred. [4]

The Old Colony was a successful railroad, in part because it early attracted or assimilated numerous branch lines. By the 1870s, the Old Colony controlled traffic over much of the lines of southeastern Massachusetts. A substantial part of its business was as a summer resort carrier, and it won great loyalty from Boston-area residents who summered on Cape Cod or the Islands. The company was also the proud possessor of the Fall River Line, a highly successful steamship company with boats that sailed nightly from the railroad's Fall River terminus to New York City via Long Island Sound. The Fall River line continued for ninety years, long after rival all-rail connections to New York had been constructed.

In 1888, in large part to prevent the growing New Haven system from gaining access to Boston, the Old Colony acquired the Boston & Providence Railroad, which for over fifty years had had its terminus in Boston's Park Square. The New Haven, however, was a much larger system, then building a New England-wide rail network under the ambitious guidance of its president, Charles P. Clark (1836-1901). In 1893, despite its efforts, the New Haven acquired the Old Colony, thereby winning two routes into the city.[5]

Another element of the New Haven system in Boston was the New York & New England, a road whose history was strewn with defaults and reorganizations. As the Midland Railroad, it had completed a line into Boston in 1849, crossing Fort Point Channel near the present Summer Street bridge to a wood-frame station on the site of the present South Station headhouse. A later incorporation of the railroad became famous as the route of the White Train, an "air line" route across southern New England to New York. In the early 1890s it was part of a projected Pennsylvania scheme to provide New England with Reading anthracite coal. With the collapse of the Pennsylvania scheme in 1893, it, too, was gathered into the New Haven fold. Thus, within the space of four years, three of the four railroads from the west and south had come into the control of a single organization.

The Boston Terminal Project

The corporate consolidation of the rail lines made a physical consolidation desirable. The plan for a Union Station for lines from the south and west was one of the principle goals of Mayor Josiah Quincy (1859-1919), an ardent believer in civic improvements. Early in January 1896, even prior to officially taking office as the city's thirty-fourth mayor, Quincy met with New Haven president Charles Clark to request that New Haven and Boston & Albany interests consider a single passenger station on the south side of the city.

The two railroad systems agreed to the mayor's proposal and with the backing of the city, organized the Boston Terminal Company to acquire the necessary land and construct and operate the new terminal. The Boston Terminal Company was incorporated in Chapter 516 of the Laws of 1896.[6] The South Station project was a substantial one with a large, two-story, headhouse and terminal building, a glass and steel trainshed, that when completed was the second widest (after St. Louis) in the world, an underground tracked baggage handling system and a large railyard with a capacity for 737 daily trains. The project necessitated not only the realignment of major train lines and construction of the bascule bridge, but a reconstruction of the north shore of Ft. Point Channel as well. Work began in July 1896, and the new station, considered the largest in the world at the time, opened for business December 30th, 1898.[7]

Although the Old Colony's rail alignment was little changed, the New England Railroad terminal route had to be relocated, joining the Old Colony alignment at the intersection of the two lines six-tenths of a mile south of the bridge. Hitherto, the Fort Point Channel bridge had carried the rails of only the Old Colony; with the relocation of the New York & New England Railroad tracks from its Summer Street alignment, the new bridge would have to carry this line as well. Altogether, six lines of track now crossed Fort Point Channel, where three had crossed before. The two easternmost tracks (now out of service and removed) were devoted to suburban service, serving the loop track which once descended to a basement station for commuter lines. The remaining four tracks served what became the New Haven's Plymouth and Midland divisions. The larger numbers of tracks, together with the increased loadings that newer and heavier trains would require, mandated a new bridge at this site.

The rolling lift design was not the first choice of the railroad, which had considered a more conventional draw, probably similar to the earlier span. However, the greater width of the span, must have made a six-track jackknife draw impractical. Other types of horizontal swing bridge's, such as a center-pivot swing, took up too much of the channel and required too much time to open and close. More conventional fixed-trunnion bascules also took up too much of the navigation channel when open. These considerations led the railroad to turn to the Scherzer Rolling Lift Bridge Company of Chicago for a new type of bascule, one uniquely suited to spans of this configuration.

William Scherzer and the Scherzer Rolling Lift Bridge

William Scherzer (1858-1893), the inventor of the rolling lift bridge, was born in Peru, Illinois. After five years in a civil engineering course at the Polytechnic School in Zurich, Switzerland, he returned to the United States in 1880. He joined the Pittsburgh, Fort Wayne & Chicago Railway Company in 1883, where he produced his first bridge designs. Two years later he became the principal assistant to the chief engineer of the Keystone Bridge Company. He continued to work for Keystone as chief of their Chicago office until 1893, when he resigned to set up his own consulting and contracting business.[8]

Unfortunately William Scherzer died in July 1893 at the age of 35, reportedly of typhoid fever. Scherzer was unmarried and his work was taken up by his brother, Albert H. Scherzer (1865- ?), who organized the Scherzer Rolling Lift Bridge Company. The firm successfully built lift spans all over the country for several decades. William Scherzer's last and most significant engineering work, whose completion he never lived to see, was the design of two rolling lift bridges over the Chicago River.

In May 1893, two months before his death, William Scherzer filed a patent for a lift bridge, granted the following December as No. 511,713. Its principal claim, and the feature which distinguishes all Scherzer spans, is:

> A lift-bridge having a moveable span provided at one end with a curved part adapted to rest and roll upon a stationary supporting surface.[9]

Other characteristics noted in the patent, also found in the Fort Point Channel bridge, include:

- teeth or projections on the said curved part adapted to interlock with projections on the supporting surface to hold the said curved part from moving or slipping on said surface; and

- means for moving the span, comprising a horizontally moving part connected with the span at or near the central point of said segmental or sector-shaped part.[10]

The 1893 patent did not specify the type of truss, and in fact the patent drawing depicts a half-thru truss, with a portion of the lower chord below the bridge deck. The company's second patent, No. 721,918, filed in 1901, describes and depicts a true thru truss, like that at Boston. In particular, the second patent locates the counterweights, attached to the projecting parts of the moving span. Most importantly, the 1901 patent describes

> the operating strut being provided with a rack-bar, operating devices for said strut embracing a gear-pinion intermeshing with said rack-bar and a supporting-roller on which the outer end of said operating-strut rests and rolls.[11]

In large part, the design evolved out of the need to erect rail and highway bridges at close intervals over the Chicago River. The prototype Scherzers were both completed in 1895 on adjacent sites over the Chicago River. William Scherzer's initial design had been for the Metropolitan West Side Elevated Railway, which constructed two double track bridges placed side by side that were normally coupled together. Albert Scherzer later wrote that a trunnion-type bridge at the location could not be used because it did not move back from the waterway when it was opened. To achieve the necessary navigation channel, therefore required a larger span than a trunnion-type structure provided.[12] The Fort Point Channel Bridge completed five years later elaborated on this design with a set of three double-track bridges, which also could be coupled together.

The other 1895 Scherzer was a highway bridge built to carry Van Buren Street over the Chicago River. It replaced a center-pivot swing bridge, partly to give a wider navigation channel, and partly because the swing span would have fouled the Metropolitan Elevated Railway's Scherzer, then also being constructed. A third Scherzer bridge, built two years later, carried North Halstead Street over the same river.

The Fort Point Channel bridge was the fourth Scherzer to be completed, and the first built outside of Chicago.[13] Although shorter than the previous three spans, the Boston example is the most complex, since the bridge is made up of three independent parallel spans, all carried on a skew of 42 degrees to the channel.

In the following decades, a large number of rolling lift bridges were built, both for rail and highway traffic. In a 1902 letter to the Railroad Gazette, Albert Scherzer wrote that more Scherzer rolling lift bridges had been built than all other types of bascules combined.[14] Examples can still be found in Massachusetts: eight Scherzers are included in the bridge database maintained by the Massachusetts Highway Department. In eastern Massachusetts, a double-leaf Scherzer (1906) carries U.S. Route 6 over the Taunton River between Fall River and Somerset; another double-leaf example over the Saugus River between Lynn and Revere carries State Route 1A (1934-36); and a set of four drawbridges built by the Boston and Maine Railroad in 1931, carry their lines out of North Station across the Charles River.[15]

After Albert Scherzer's death, his widow continued to run the firm until 1936 when she agreed to sell her interests to the firm's office manager, Craig Hazelet and his chief engineer, Ingolf Erdal. The successor firm continues to produce the rolling lift design, still a favorite among railroad companies for moveable spans.[16]

New York, New Haven & Hartford Railroad Engineers: F.S. Curtis and W.H. Moore

Although the Scherzer Rolling Lift Bridge Company designed the bridge and supervised its construction, the railroad aspects of the structure were designed and supervised by the New York, New Haven & Hartford in-house engineers. Those most closely associated with the project were the railroad's chief engineer and later President of the road, Fayette Samuel Curtis (1843-1929), and his Engineer of Bridges, William Harley Moore (1860-1920). It was Curtis and Moore who had selected the Scherzer Rolling Lift Bridge to be the type of bridge to cross Fort Point Channel and who had the final say in the design of the South Station railyard including the placement of the tracks, bridges and signals. Beyond the South Station project, the team was instrumental for the growth of the railroad in terms of routes taken, the engineering for these roads and for the decision as to which type of bridges should be built at major crossings.

A native of Owego, New York, Curtis began his railroad career at the age of 20, working for the Albany & Susquehanna Railroad. For the next several years he served in various engineering capacities on railroads in New York state. As assistant engineer for the New York & Harlem Railroad, he helped to lay out the tracks and yards of New York City's original Grand Central Station in 1869-71. He served as chief engineer of the road and its successor, the New York Central & Hudson River Railroad, from 1874 until 1882, when he was named chief engineer of the New Haven.

The New Haven Railroad had been growing steadily since the 1872 merger of the New York & New Haven and the New York & Hartford and in the late 1880s, under company president Charles B. Clark, the company determined to control all railroad trackage in southern New England. Curtis was responsible for much of the major engineering work, including the four-tracking of the company's main line between New York and New Haven, and rebuilding the line from New Haven to New London. In 1900, the year that the rolling lift bridge was completed, Curtis was elected vice-president of the railroad. He resigned in 1907 to become president of the Old Colony and Union Freight railroads in Boston. Thereafter, he made his home in Boston, and he died in the Jamaica Plain area of the city in 1929.[17]

William Harley Moore, born in Limerick, Ireland in 1860, received his engineering education at Queen's College, Cork and the Royal University of Dublin. At the age of 25, with first class Honors and a Master of Engineering degree, he sailed to the United States. For about a year he was employed as a draftsman for the Bridge Engineering Department of Curtis's former railroad company, the New York Central & Hudson River Railroad. In May of 1886, he joined the New York, New Haven & Hartford Railroad. In 1889, the year that the railroad finally bridged the

Thames River at New London, thus making the shore line a through route from Boston to New York, Moore was named Engineer of Bridges. Moore was responsible for the design of nearly all of the four-track bridges between New York and New Haven, as well as several large drawbridges. The present Thames River bascule bridge at New London (1918) was the last designed and built under his supervision.[18]

Construction 1898 - 1900

Construction was a year and a half underway on the Union Terminal project before the New Haven Railroad submitted its bridge plans for approval by the Massachusetts Board of Harbor and Land Commissioners.[19] As the new lift bridge was constructed on an adjacent site, rail service was not interrupted. However, to avoid disrupting water traffic on the channel, it was necessary to build the three lift spans in an open, upright position. A falsework tower was designed that could be moved from truss to truss as needed. Engineers from the Scherzer Rolling Lift Company supervised construction while Dwight and Daly of Boston were the contractors for the six masonry piers. The steel superstructure was built and erected by the Pennsylvania Steel Company of Steelton, PA, then also at work on the New Haven's Baltimore through truss at Readville, a few miles to the south.[20]

Other related work at the time included the construction of the "Y" track, ostensibly to allow the Old Colony and the Boston & Providence divisions to exchange traffic, "when such a link should be necessary." However, in 1915, in their criticism of the Y track as an obstruction to navigation, boat owners noted that the bridge had not been used "for years," and the rails had been removed "a long time ago."[21]

DESCRIPTION

Superstructure

The Fort Point Channel Bridge of the New York, New Haven, and Hartford Railroad was built to carry six tracks, two on each of three separate and identical spans. Each moveable span consists of a pair of riveted thru trusses, from each of which extend a rolling heel segment and a counterweight made up of cast-iron blocks. A stationary platform to the rear of each lift span supports the operating machinery which drove the span by means of an "operating strut."

The bridge crosses the channel on a 42-degree skew. In order to make a right-angle connection between each span and its operating strut, the rolling end of each span was made square, instead of oblique. As a result, the two trusses of each span are of differing lengths, the easternmost truss of each truss pair is 84 feet in length, and the opposite member of the pair, 114 feet in length. The trusses of each span are 27 feet 2 inches apart; adjoining spans are 28 inches apart, center-to-center. The trusses are Warren types with vertical hangers for the floor system at alternate panel points. The trusses are 25 feet high at the inclined end posts, rising to 35 feet 6 inches where the truss connects with the rolling heel segment. The floor system is supported by plate girder crossbeams carried by the hangers of each truss. In turn, the crossbeams support four lines of 30-inch plate girders forming the track stringers. The trusses themselves are made up of pairs of rolled or built steel channels, latticed and connected by very large gusset plates. The spans, which have a vertical clearance of 21 feet 6 inches, were designed to support a live load of two 131-ton locomotives (with tenders), followed by a train weighing two tons per linear foot.

From the north (land) end of each truss extends the heel, or rolling segment and counterweight supports. The rolling segment is a double-web plate girder, with a straight top flange and curved lower flange, shaped as 80 degrees of a full circle 52 feet in diameter. The segment's arc measures almost 36 feet in length and 18 inches wide. To the arc surface is bolted cast-steel segmental shoe plates with rectangular mortises to engage teeth cast on the top of the horizontal track plates. This arrangement, described in the first Scherzer patent (see above), was designed to prevent the span from slipping and to act as guides. The steel counterweight frame, fixed to the land end of the rolling segment, holds cast-iron blocks 18 inches square and 4-10 inches in thickness. The shorter trusses are balanced by 570 blocks, the longer trusses required 621 blocks. When open, the counterweights descended part way into a slot immediately behind the heel segment.

The stationary platform behind each lift span was erected on the approach girders 30 feet above the track level. Each platform carried a 50-horsepower Westinghouse electric motor, which through a gear set and rack-and-pinion arrangement drove the 60-foot operating strut back and forth. The far end of the strut was pinned to a short longitudinal girder on the center line of the top laterals of each truss. As the bridge opens, the center of gravity moves backward in a horizontal line, also traced by the movement of the strut.[22] The time required for opening or closing each span was usually 30 seconds, although in a high wind the time could be extended to 90 seconds, making it less vulnerable to wind, by engaging a separate set of gears.

Originally the bridge was manned from an operator's house above the fixed platform of the middle span, and 45 feet above track level. This house was removed sometime after 1948. Although the operating struts, gear sets, and motors remain in place, they have been disabled, and power withdrawn from the bridge.

When closed, each span was locked in place by two latches, which engage a cast-steel socket bolted to the floor beams of the draw. The latches themselves rested on the middle channel pier, each carried by four 4-3/4-inch diameter wheels allowing the latch to move along the pier. The latches were driven from worm gears on a continuous shaft which ran the length of the pier, in turn powered by an independent 5-horsepower electric motor. Thus all the latches were acted upon simultaneously. (Draws that were not in service were left up, and their latches operated idly with the others.) This original latch system was replaced at a later date with a simple catch, hanging from the floor system at the center of each span. When released by a lever to the track floor the catch engages a socket bolted to the stone masonry.

The trusses were often operated in tandem. Connecting links connected the short trusses of adjoining spans at a connection above the heel post panel point of the top chord. These connecting links are no longer in place.

<u>Substructure</u>

The full bridge is carried across the 240-foot channel by six granite piers, three on each side of the central 42-foot navigation channel. The three piers on the south side of the channel carry four lines of continuous deck-plate girders. The third pier, flanking the navigation channel on the south side, carries the end of the lift spans and the latching mechanism. The fourth and fifth piers, 22 feet 3 inches apart, carry the bulk of the load when the bridge is in a raised position, the fourth pier supporting the rolling end of the long trusses, and the fifth pier supporting the rolling end of the short trusses. An adjustable pedestal on the fourth pier provides an intermediate support for the long truss when the bridge is in a closed position. Pier six and the adjacent land abutment support the approach girders and the operating platform.

The piers, laid in rock-faced ashlar with battered sides, are of uniform plan, approximately 148 feet long and about 6 feet 6 inches wide. The caps of all but the third pier are approximately 10 feet below the base of the track rails, or 4.67 feet above mean high water (Boston datum). The fourth pier, which receives the end of the lift spans, is 4 feet higher. Wooden navigation fenders kept vessels within the determined channel. Although the plan of these features is clearly evident, extending up the channel as far west as the Broadway Bridge, all that remains today are rows of rotting pilings.

SUBSEQUENT HISTORY

The railroad's rolling lift bridge saw its greatest use in the decades immediately following its completion. In 1906, the drawtender of the Broadway Bridge immediately upstream reported opening that swing span 2,381 times (approximately 6-1/2 times each day).[23] By the end of the 1930s, however, the number of openings annually was only one-fifth the number three decades before. In 1948, the City replaced the adjacent retractile span carrying Dorchester Avenue with a fixed span. That action halted all water traffic above Dorchester Avenue and eliminated any further need to continue operation of the railroad bridge as a moveable span. The bridge was made fixed the same year.[24]

Today only the three westernmost tracks remain in use. The floor structure (track ties and rails) of the eastern span and its southern approach have been removed, and the steel superstructure removed from its southernmost approach span. In addition, track has been removed from the eastern side of the center span and the roadbed converted to a walkway. Track and ties have also been removed from the southern approach to the eastern side of the center span.

Because of uneven settlement of the bearing seats, passing trains now causes considerable movement to the bridge. Concern for this condition, as well as rust and deteriorated rivet connections have caused the Massachusetts Bay Transit Authority (MBTA) to require a 5 mile-an-hour speed limit on the bridge for over a decade.

SIGNIFICANCE

The Fort Point Channel Bridge, today believed to be the oldest surviving Scherzer Rolling Lift Bridge, was the fourth and largest example of this type of moveable bridge built and the first example built outside of Chicago. It is a major national example of a moveable bridge technology widely adopted in subsequent years for both railway and highway spans.

Added significance is given by the context of the bridge: Fort Point Channel is today spanned by five moveable bridges, all examples of different types of nineteenth-century moveable bridge technology. With the exception of the 1930 Congress Street bridge, all were built in the period 1898-1915. Two different types of bascule bridges (Congress Street, a trunnion bascule; New Haven Railroad bridge, a rolling lift bascule) flank a rare retractile drawspan (Summer Street). All three are flanked by two swing spans located at either end of the channel: Northern Avenue on the north end, and Broadway at the south end.

ENDNOTES

1. Nathaniel B. Shurtleff. A Topographical and Historical Description of Boston, 3rd ed. (Boston: Rockwell & Churchill), p. 107. Fort Point itself took its name from its proximity to the first fort erected on the peninsula.

2. Walter Muir Whitehill, Boston, A Topographical History, (Cambridge: Harvard University Press), pp. 101-105.

3. City of Boston, Annual Report of the City Engineer for the Year 1888 (Boston, 1889).

4. See, for example, Chapter 201, Laws of 1867, which authorized the Old Colony & Newport Railway to widen its bridge over Fort Point Channel under the direction of the Harbor Commissioners; in 1881, the Harbor & Land Commissioners permitted the Old Colony Railroad to extend its pile wharf on Fort Point Channel; in 1888 the Old Colony was licensed to widen and extend its draw pier.

5. Alvin F. Harlow, Steelways of New England (New York: Creative Age Press, 1946), pp. 233-234.

6. "An Act to provide for a Union Station for Passengers on Railroads Entering the Southerly Part of the City." the legislation was approved by the governor June 9th, 1896.

7. "City of Trains. Boston's Mammoth Station Opened," Boston Daily Globe 31 December 1898.

8. "William Scherzer, A Memoir," Journal of the Association of Engineering Societies 13 (1894): 227-228.

9. Patent No. 511,713, U. S. Patent Office, Official Gazette, 20 December 1893, pp. 2042-2043.

10. Ibid.

11. Patent No. 721, 918, U. S. Patent Office Official Gazette, 3 March 1903, pp. 111-112.

12. Letter, Railroad Gazette 25 July 1902, p. 581.

13. The first eight Scherzers are described in a contemporary article, "Rolling Lift Bridge at the Boston Terminal," Engineering News 43 (15 March 1900): 170-172.

14. Letter, Railroad Gazette 25 July 1902, p. 581.

15. Stephen J. Roper, Mass. Highway Department, Historic Bridge Survey. Courtesy of the author.

16. John Schultz, Hazelet and Erdal (547 West Jackson Blvd., Chicago, IL), personal communication, June 1992.

17. "Fayette Samuel Curtis," National Cyclopedia of American Biography 23 (1923): 120-121.

18. "Memoir of William Harley Moore," American Society of Civil Engineers, Transactions 84 (1921): 892-3.

19. Massachusetts Board of Harbor & Land Commission License No. 2103, approved 23 February 1898. The plan submitted to the Commission (No. 2103), is housed in the plan files of the successor agency, the Waterways Division of the Massachusetts Department of Environmental Protection, 1 Winter Street, Boston.

20. Other railroad through truss bridges built by the Pennsylvania Steel Company in the area including the Central Massachusetts Railroad's Linden Street Bridge in Waltham (1894), and the 1911 Strauss trunnion bascule on the Rockport line over Manchester Harbor.

21. "New Haven Wants Bridge," Boston Evening Transcript 5 January 1915, p. 1.

22. George A. Hool and W. S. Kinne, eds., Movable and Long-Span Steel Bridges (New York: McGraw-Hill Book Co.), p. 15.

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"Detail of Track Girders for Rolling Lift Bridge." May 1898. Photocopy from a Mylar print of an original drawing of the Scherzer Rolling Lift Bridge Company. Located at Bechtel/Parsons Brinckerhoff, Boston, MA.

"Detail of Track Girders for Rolling Lift Bridge." Date obscured on drawing. Photocopy from a Mylar print of an original drawing of the Scherzer Rolling Lift Bridge Company. Located at Bechtel/Parsons Brinckerhoff, Boston, MA.

"Detail of Portal and Operating Strut Connections for Rolling Lift Bridge." Date obscured on drawing. Photocopy from a Mylar print of an original drawing of the Scherzer Rolling Lift Bridge Company. Located at Bechtel/Parsons Brinckerhoff, Boston, MA.

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New York, New Haven & Hartford Railroad Photo No. 278 "Old Colony R.R. Draw Bridge, Looking from New Rolling Lift Bridge." July 24, 1899. This view shows the original Old Colony Railroad Bridge which was replaced by the Scherzer Lift Bridge. Photocopy from original photograph. Located at Archives, Society for the Preservation of New England Antiquities, Boston, Massachusetts.

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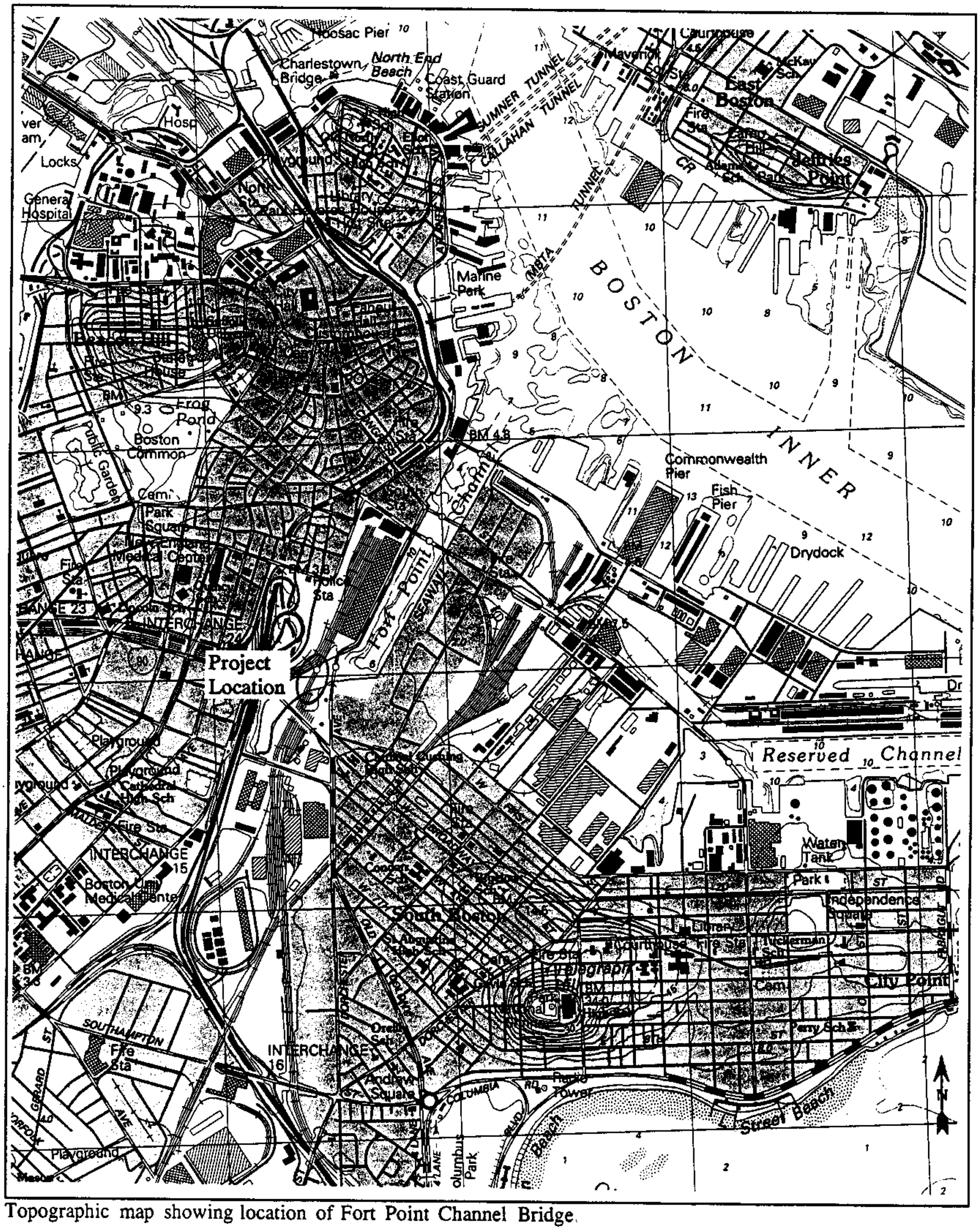

Topographic map showing location of Fort Point Channel Bridge.

ADDENDUM TO
NEW YORK, NEW HAVEN AND HARTFORD RAILROAD, FORT POINT
CHANNEL ROLLING LIFT BRIDGE
(SCHERZER ROLLING LIFT BRIDGE)
Spanning Fort Point Channel
Boston
Suffolk County
Massachusetts

HAER No. MA-35

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